**Code and Name:**

**MAT5760 Summability Methods**

**Unit:**

Institute of Science, Department of Mathematics

**Details:**

* **Term:** 2023-2024 Spring
* **Status:** Elective
* **Class Level:** 1
* **Credit Hours:** 3-0-0-3
* **ECTS:** 6
* **Language:** Turkish

**Course Instructors:**

* **Course Coordinator:** ...
* **Assistant Instructor:** ...
  + **Phone:** ...
  + **Email:** ...@firat.edu.tr
  + **Social Accounts:** ...

**Weekly Schedule**

| **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** | **Saturday** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |

**Teaching Method:**  
Each weekly hour will include at least 45 minutes of face-to-face teaching.

**Location:**

* **In-person (YY):** Classroom (To be announced)
* **Remote (UE):** -

**Objective:**

To provide knowledge on matrices and linear transformations, the Silverman-Toeplitz theorem, Kojima-Schur theorem, the characteristics of a conservative matrix, co-regular and co-null matrices, the Schur theorem, and weak and strong convergence in sequence spaces.

**Materials:**

1. J. Boos, *Classical and Modern Methods in Summability*
2. R.E. Powell and S.M. Shah, *Summability Theory and Applications*

**Student Responsibilities:**

Students are required to attend at least 70% of the classes.

**Weekly Lesson Plan:**

| **Week** | **Topic** | **Methodology** |
| --- | --- | --- |
| 1 | Basic concepts and theorems in summability | Face-to-Face |
| 2 | Characteristics of a conservative matrix, Schur theorem, and applications | Face-to-Face |
| 3 | Matrices and linear transformations: Silverman-Toeplitz and Kojima-Schur theorems | Face-to-Face |
| 4 | Strongly conservative matrix methods, comparison and consistency theorems | Face-to-Face |
| 5 | M-type matrices and mean value properties | Face-to-Face |
| 6 | Special summability methods: Cesàro and Hölder methods | Face-to-Face |
| 7 | Weighted averages and Riesz methods | Face-to-Face |
| 8 | Functional analytic proofs of Toeplitz-Silverman type theorems | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | Special matrices: Borel, Euler-Knopp, Abel, Nörlund, and Riesz matrices and averages | Face-to-Face |
| 11 | Hausdorff methods | Face-to-Face |
| 12 | Types of convergence: Abel, statistical, Cesàro, and their relationships | Face-to-Face |
| 13 | FK-spaces and duals of sequence spaces | Face-to-Face |
| 14 | Weak and strong convergence in sequence spaces | Face-to-Face |

**Assessment and Evaluation:**

| **Method** | **Quantity** | **Weight** |
| --- | --- | --- |
| **Midterm Exam** | 1 | 50% |
| **Quizzes** | None | - |
| **Assignments** | Pre- and post-midterm activities | - |
| **Projects** | None | - |
| **Final Exam** | 1 | 50% |

**Learning Outcomes:**

1. Learn the Silverman-Toeplitz and Kojima-Schur theorems.
2. Understand the characteristics of a conservative matrix and co-regular and co-null matrices.
3. Learn the Schur theorem, weak and strong convergence in sequence spaces, and special matrices.
4. Understand Borel, Euler-Knopp, Abel, Nörlund, and Riesz matrices.
5. Learn Hausdorff methods, Abel convergence, statistical convergence, and their relationships.

**Special Notes:**

* **UE:** Remote Education
* **YY:** Face-to-Face Education